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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,632	12/26/2003	SHUN-LI LIN	12398-US-PA	1631

31561 7590 06/21/2005

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER	
PHAM, THANHHA S	
ART UNIT	**PAPER NUMBER**
2813	

DATE MAILED: 06/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/707,632	LIN ET AL.	
	Examiner	Art Unit	
	Thanhha Pham	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-10 and 17-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10 and 23-25* is/are allowed.

6)☒ Claim(s) *7-9,18-22,26-29 and 31-34* is/are rejected.

7)☒ Claim(s) *17, 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Applicant's Amendment dated 04/06/2005.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 21-22, 26-27 and 33-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Limitations of "wherein the optical isolation layer comprises an organic layer" and "wherein the optical isolation layer comprises an inorganic layer" are not supported by specification or figures.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

► With respect to claim 9, "wherein the patterned photoresist layer and the patterned antireflection coating are also removed in the etching operation" renders the claim indefinite. It is not clear how an etching operation using the patterned photoresist layer as a mask in which the layer has an etching rate greater than the optical isolation layer can be performed (see claim 8) wherein the patterned photoresist layer and the patterned anti-reflection coating are also removed (notice that when the patterned photoresist and the patterned anti-reflection coating are remove, etching operation can not be performed using the patterned photoresist as a mask).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 7-9, 18-19, 28-29 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. [US 2001/0051425].

► With respect to claims 7 and 18, Lee et al. (figs.4-8 and text paragraph [0001]-[0033]) discloses a method of fabricating a semiconductor device comprising the steps of:

providing a substrate (110, fig. 4, text paragraph [0020]-[0021]) having at least a film layer (115), an optical isolation layer (polysilicon layer 120: *Polysilicon with a thickness of 500-2000 angstroms would have ability of absorbing light in the photolithograph process to pattern the*

photoresist layer. Polysilicon layer 120 would prevent/reduce light from going to the ILD layer 115 in the photolithographic process. The polysilicon 120 would function as the optical isolation layer), an antireflection coating (125) and a photoresist (130) sequentially formed thereon, wherein the optical isolation layer has a light absorption coefficient to block light through the antireflection coating incident thereon (*polysilicon 120 would has a light absorption coefficient to block light through antireflection coating incident thereon*), wherein the optical isolation layer has a light absorption coefficient greater than 1.8 (*polysilicon has a light absorption coefficient greater than 1.8*);

performing a photolithographic process to pattern the photoresist layer so that a portion of the anti-reflection coating is exposed (see figs. 4 & 5, text paragraph [0021]-[0022]); and

patterning the antireflection-coating (125), the optical isolation layer (120) and the film layer (115) to form an opening in the film layer (see figs. 6-7, text paragraph [0023]-[0025]).

► With respect to claim 28, Lee et al (figs.4-8 and text paragraph [0001]-[0033]) discloses a method of fabricating a semiconductor device comprising the steps of:

providing a substrate (110, fig. 4, text paragraph [0020]-[0021]) having at least a film layer (115), an optical isolation layer (polysilicon layer 120: *Polysilicon with a thickness of 500-2000 angstroms would have ability of absorbing light in the photolithograph process to pattern the photoresist layer. Polysilicon layer 120 would prevent/reduce light from going to the ILD layer 115 in the photolithographic process. The polysilicon 120 would function as the optical isolation layer*), an antireflection coating (125) and a photoresist (130) sequentially formed thereon,

wherein the optical isolation layer has a light absorption coefficient greater than 1.8 (*polysilicon has a light absorption coefficient greater than 1.8*);

performing a photolithographic process to pattern the photoresist layer so that a portion of the anti-reflection coating is exposed (see figs. 4 & 5, text paragraph [0021]-[0022]); and

patterning the antireflection-coating (125), the optical isolation layer (120) and the film layer (115) to form an opening in the film layer (see figs. 6-7, text paragraph [0023]-[0025]).

► With respect to claims 8 and 29, Lee et al. (figs. 5-7 and text paragraph [0014] & text paragraph [0021] lines 8-10) discloses the step of patterning the antireflective coating, the optical isolation layer and the film layer comprises performing an etching operation using the patterned photoresist as a mask in which the film layer has etching rate greater than the optical isolation layer.

► With respect to claim 9, Lee et al. (figs 7-8, text paragraph [0026] and [0028]) discloses wherein the patterned photoresist layer and the patterned anti-reflection coating are also removed in etching processes after performing said etching operation.

► With respect to claims 19 and 31, the optical isolation layer of Lee et al comprises a conductive layer of doped polysilicon.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 20 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. [US 2001/0051425] in view Buehrer et al. [US 2004/0198030].

With respect to claims 20 and 32, metallic layer is a known material having a light absorption characteristic for optical isolation layer. Selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." 325 U.S. at 335, 65 USPQ at 301. See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious). See Tsujita et al (figs 4's text paragraph [0030] and [0041]) as an evident that show using the metallic layer (320) for optical isolation layer. Therefore, at the time of invention, it would have been obvious for those skilled in the art, in view of Bueher et al, to use the metallic layer as a known material for optical isolation layer in the process of Lee et al to improve photolithography patterning.

Allowable Subject Matter

3. Claims 10, 23-25 are allowed.

4. Claims 17 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: Recorded Prior Art fails to disclose or suggest the combination process steps of fabricating a semiconductor device as recited in the base claims 7 or 28 respectively including: removing the patterned photoresist layer and the anti-reflection coating, forming a material layer over the substrate covering the optical isolation layer and completely filling the opening, and performing a chemical-mechanical polishing operation using the optical isolation layer as a polishing stop layer to remove the material layer over the optical isolation layer as characterized in claim 17 or 30.

Response to Arguments

6. Applicant's arguments filed 04/06/2005 have been fully considered but they are not persuasive.

With respect to Applicant's Argument on page 8-11, Applicant argues that the claimed invention can not be anticipated by Lee et al. since Lee fails to recognize the antireflection layer (125) though capable of minimizing the interfere between the incoming light and the reflected light during the photolithography process but some of the light still passes through the antireflection layer to adversely affect the critical dimension of the photoresist pattern. The argument is not persuasive since Lee et al discloses the process of fabricating the semiconductor device using the same materials

(same materials of ARC and the optical isolation layer) and forming the same structure as the claimed invention. The optical isolation layer (120, polysilicon) under the antireflection layer (125) would have the same characteristics as being claimed. "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." Atlas Powder Co. v. Ireco Inc., 190F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). Thus the claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. In re Best, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See also MPEP § 2112.01 with regard to inherency and product-by-process claims and MPEP § 2141.02 with regard to inherency and rejections under 35 U.S.C. 103.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thanhha Pham
Patent Examiner
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PRIMARY EXAMINER